CLAIMS

What is claimed is:

1. A method of encoding framing data in a packet having a specific number of flits, a flit having a specific number of bits, the method comprising:

inserting two framing bits into the packet if the packet is a first length;

inserting four framing bits into the packet if the packet is a second length; and

inserting eight framing bits into the packet if the packet is a third length such that space in the packet for data is maximized and the total number of bits of the packet can be determined either after reading a first framing bit if the packet is the first length or after reading a second framing bit if the packet is the second length or the third length.

2. A method as recited in claim 1 further comprising inserting the two framing bits in bit positions 85 and 87 of the packet wherein the first length is one flit.

3. A method as recited in claim 2 further comprising inserting a zero in bit position 87 and a one in bit position 85.

4. A method as recited in claim 1 further comprising inserting the four framing bits in bit position 87 and bit position 85 in a first flit and second flit wherein the second length is two flits.

5. A method as recited in claim 4 further comprising inserting a one in bit position 87 and a zero in bit position 85 for the first flit and a zero in bit position 87 and a one in bit position 85 for the second flit.

6. A method as recited in claim 1 further comprising inserting the eight framing bits in bit position 87 and bit position 85 in a first flit, a second flit, a third flit, and a fourth flit wherein the third length is four flits.

7. A method as recited in claim 6 further comprising inserting a one in bit position 87 and a one in bit position 85 in the first flit, a one in bit position 87 and a zero in bit position 85 in the second flit, a zero in bit position 87 and a zero in bit position 85 in the third flit, and a zero in bit position 87 and a one in bit position 85 in the fourth flit.

8. A method as recited in claim 1 wherein a framing bit sequence of zero followed by one indicates the end of a packet or the beginning of a one-flit packet and a framing bit sequence of one followed by zero followed by zero followed by one indicates a two-flit packet.

9. A method as recited in claim 1 wherein a framing bit sequence of one, one, one, zero, zero, zero, zero, and one indicates a four-flit packet.

10. A method as recited in claim 1 further including initiating decoding of the packet after a first framing bit of a one-flit packet is detected and after the second framing bit of a two-flit or a four-flit packet is detected.

11. A method of calibrating a link between two nodes comprising:

sending from a first node to a second node a packet having a user field in which a first counter value is stored;

incrementing a second counter value at the first node with the passage of time;

returning from the second node to the first node the first counter value in the user field; and

comparing the second counter value with the first counter value and calibrating the link based on the comparison.

12. A method as recited in claim 11 further comprising setting the first node to counter mode.

13. A method as recited in claim 11 further comprising setting the second node to loop mode.

14. A method as recited in claim 11 wherein sending from a first node to a second node a packet having a user field in which a first counter value is stored further comprises placing the first counter value into a user-field specific register in the first node.

15. A method as recited in claim 11 further comprising calculating a round-trip time for the link by calculating the difference between the first counter value and the second counter value.

16. A method as recited in claim 15 further comprising determining when the first node should re-send a data packet by utilizing the round-trip time.

17. A method as recited in claim 11 wherein returning from the second node to the first node the first counter value in the user field further comprises returning the counter value without modifying the counter value.

18. A node in an interconnect link system comprising:

a first buffer for receiving a first data segment passing a first criteria based on a predetermined one or more bits for the first segment;

a second buffer for receiving a second data segment passing a second criteria based on the predetermined one or more bits for the second segment;

a first crossbar for receiving the first data segment from the first buffer; and

a second crossbar for receiving the second data segment from the second buffer, such that the first data segment and the second data segment are routed to one or more transmitters in one clock cycle in the node.

19. A node as recited in claim 18 further comprising a data packet having a plurality of bits, the predetermined one or more bits being a stripe bit wherein the stripe bit is used for inverting a portion of the plurality of bits.

20. A node as recited in claim 18 further comprising a receiver capable of sorting a plurality of received data segments based on the predetermined one or more bits in a data segment.

21. A node as recited in claim 18 further comprising a transmitter having an arbitrator to decide which data segment to transmit.

22. A node as recited in claim 18 wherein the first buffer and the second buffer are in a receiver.

23. A method of routing a received data packet through a node, the method comprising:

receiving a data packet at a receiver in the node;

examining the data packet based on one or more categorical bits in the data packet;

sorting the data packet to one of a plurality of buffers based on the one or more categorical bits in the data packet; and

inputting the data packet to one or more crossbars, a crossbar corresponding to a buffer, and routing the data packet to a transmitter such that two data packets can be processed by the node in one clock cycle.

24. A method as recited in claim 23 wherein examining the data packet further includes determining whether a stripe bit in the data packet is zero or one.

25. A method as recited in claim 23 wherein sorting the data packet further includes routing the data packet to a first buffer if the one or more categorical bits meets a first criteria and routing the data packet to a second buffer if the one or more categorical bits meets a second criteria.

26. A method as recited in claim 25 wherein the first criteria is that one or more of the categorical bits be a zero and the second criteria is that one or more of the categorical bits be a one.

27. A method as recited in claim 23 wherein inputting the data packet to one or more crossbars further comprises routing the data packet to a transmitter.

28. A method as recited in claim 23 further comprising maintaining the order of sequential data packets passing through one of the plurality of buffers.

29. An interconnect link in a data network comprising a first control status register having a first user field and a second user field where the first user field is used for communicating user data and the second user field is used for control data relating to the first user field, wherein the content of the first user field and the second user field is placed in a packet for transmission in the data network.

30. A method of communicating between two nodes connected by a link, the method comprising:

writing a message to a first user field in a first control status register in a first node;

inserting the message into a packet and routing the packet to a second node; and

moving the message to a corresponding second control status register at the second node thereby allowing communication between the first node and the second node before the link is fully operational for sending data.